

VA DEQ - SaMS
24 May 2018

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Sustainable Winter Management (SWiM™)





Industry Advisers for **SIMA**
snow & ice management association

We do “WHATEVER IT TAKES” to Develop, Support and Empower sustainable solutions for businesses and the environment to thrive.



When winter hits...
keep **ice, snow** and **your costs**
under control.

Sustainable Winter Management
(SWiM™) Program





SWiM™

B2B Solutions & Certifications

www.witadvisers.com/SWiM

Benefits



Saves Money



Reduces Risk



Protects Environment

PROGRAM INCLUDES:

- ✓ Needs Assessment
- ✓ Implementation Training
- ✓ Program Management
- ✓ Automated Monitoring
- ✓ SWiM™ Certification

ENDORSED BY





SWiM™ Vision – A new way of doing business





SWiM™ Mission – Enable A better way...



PROTECTING YOUR **PROPERTY**
PROTECTING OUR **WATER**



GOALS



50,000 Acres

10,000 Miles

3 Billion pounds of salt waste reduction

(1.5 million tons)



Why?

Independent studies conducted in NH, MN, WI, IL, NY, VA, MD, Ontario and other Great Lakes Regions indicate **a majority of** non point source pollution of **chlorides** from de-icing salts **originate from *PARKING LOTS*** and private roadways – NOT highways.

TROUBLE IN NEW HAMPSHIRE

A 2008 study on chloride contamination along the I-93 corridor helped lead to the creation of New Hampshire's Green SnowPro certification.

Total imports:
4,814 tons/yr

Imports divided
by drainage area:
473 tons/sq mile



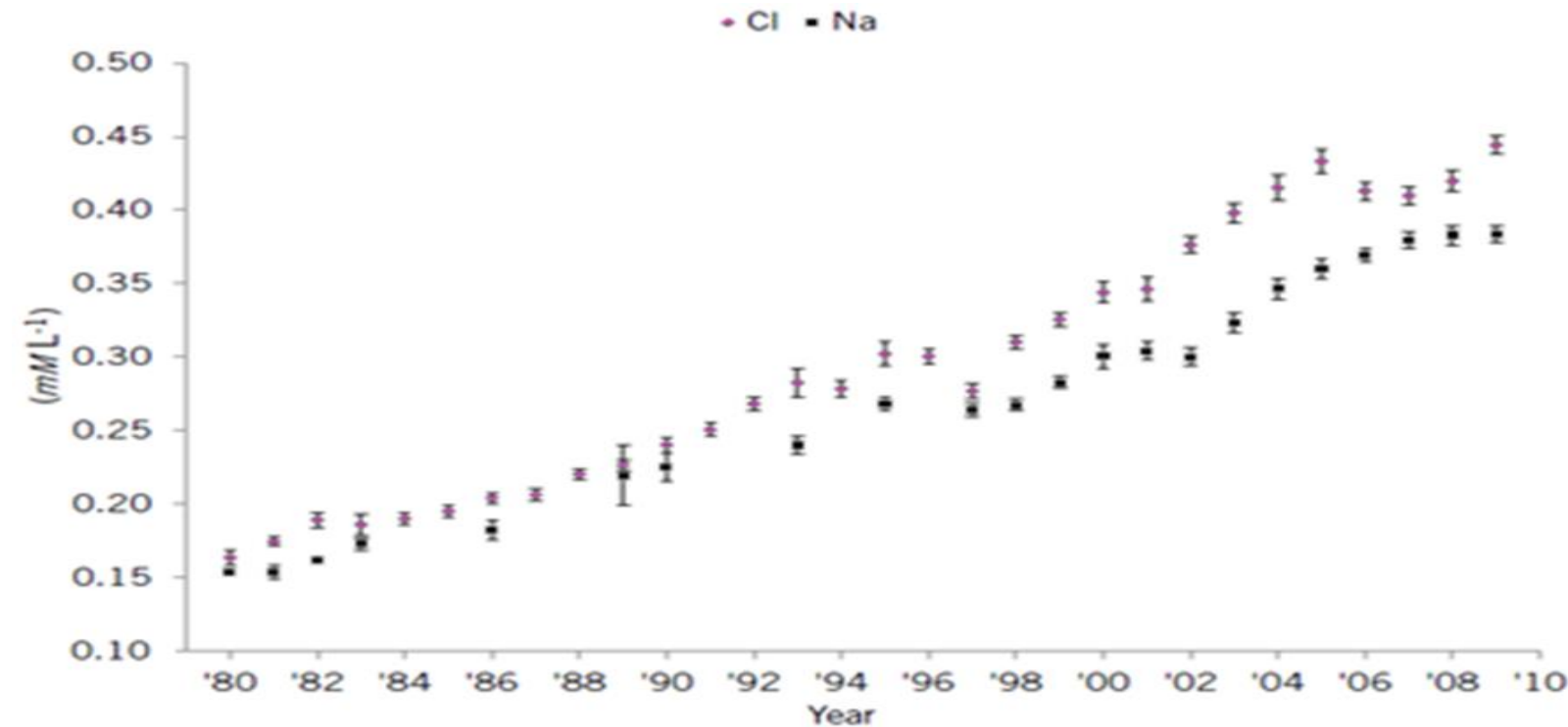
Figure 2. Chloride loads measured in Policy - Porcupine New Hampshire watershed region (Burak, et al., 2008).

SOURCE: BURACK ET AL. 2008

“Acid rain of our time”

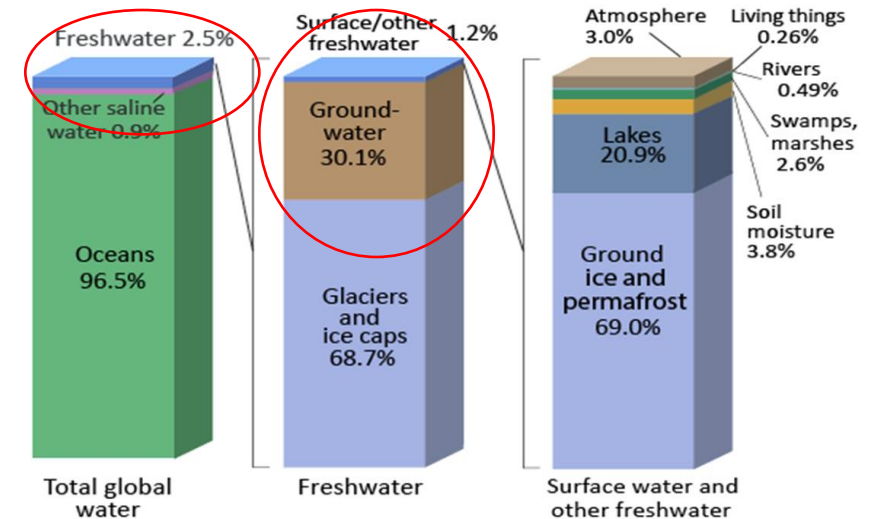
- Lake George Waterkeeper / Waterkeeper Alliance

Freshwater throughout North America is becoming increasingly contaminated with chlorides as a result of salt (NaCl) applications for managing snow and ice conditions.



Mean annual sodium and chloride concentrations (millimoles per liter) measured in Lake George, New York, from 1980-2009 (Boylen, et al., 2014).

Where is Earth's Water?



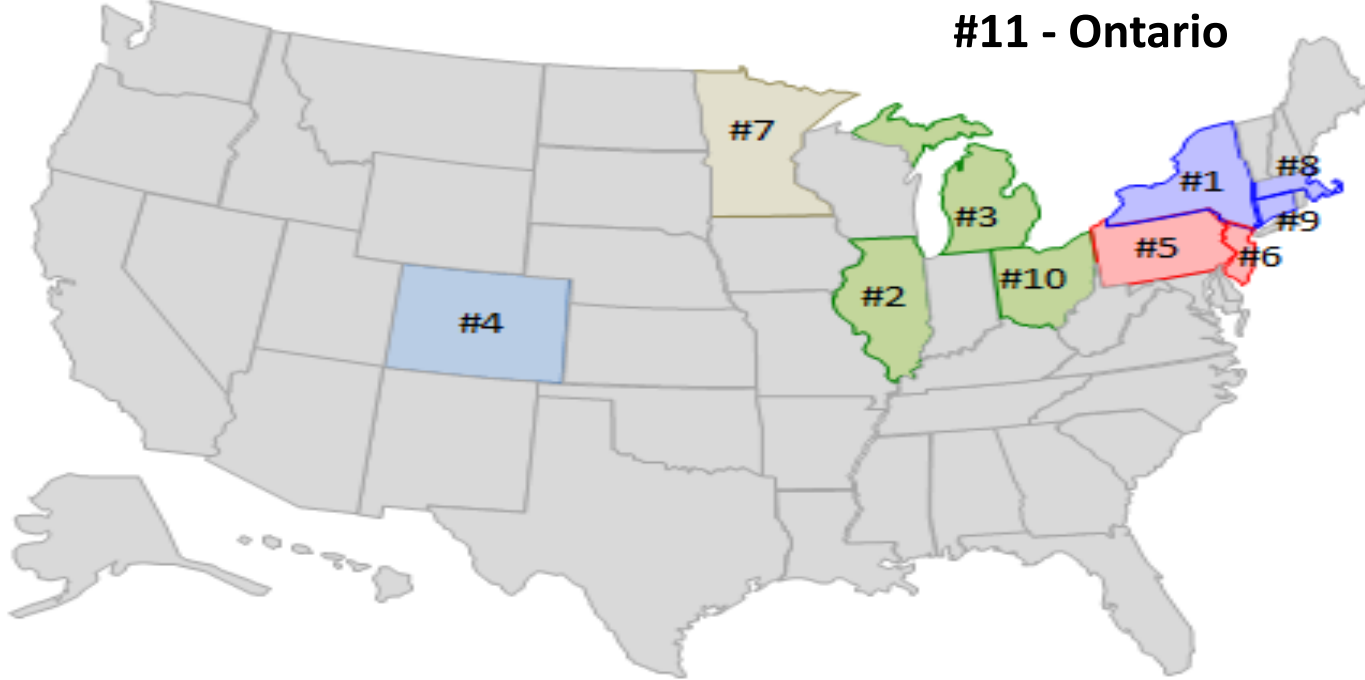
Source: Igor Shiklomanov's chapter "World fresh water resources" in Peter H. Gleick (editor), 1993, *Water in Crisis: A Guide to the World's Fresh Water Resources*.
NOTE: Numbers are rounded, so percent summations may not add to 100.

~ 1
teaspoon
pollutes 5
gallons of
Water



How will the industry change?

How can a highly fragmented industry reduce the rate and frequency of salt it applies?

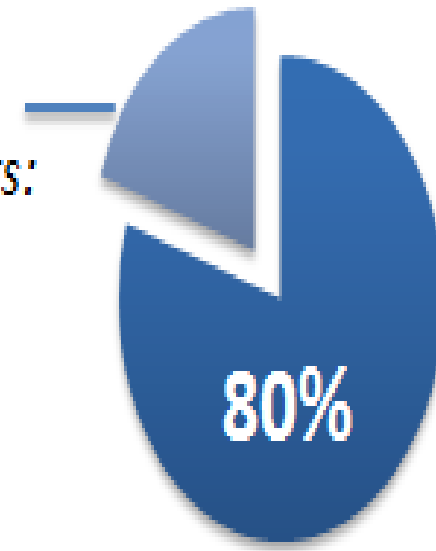


Largest commercial winter management service markets (IBIS, 2014).

TOTAL S&I SERVICE OPERATORS

Larger
Operators:

22,400



Sole
Proprietors:

88,000

The number of commercial Winter Management Operators confirmed in a 2016 Snow & Ice Management Association industry research study. (Wolf, 2016).

SUSTAINABLE SALT INITIATIVE (SSI)

SALT APPLICATION STANDARDIZATION FOR THE INDUSTRY BY THE INDUSTRY



The Sample Group:

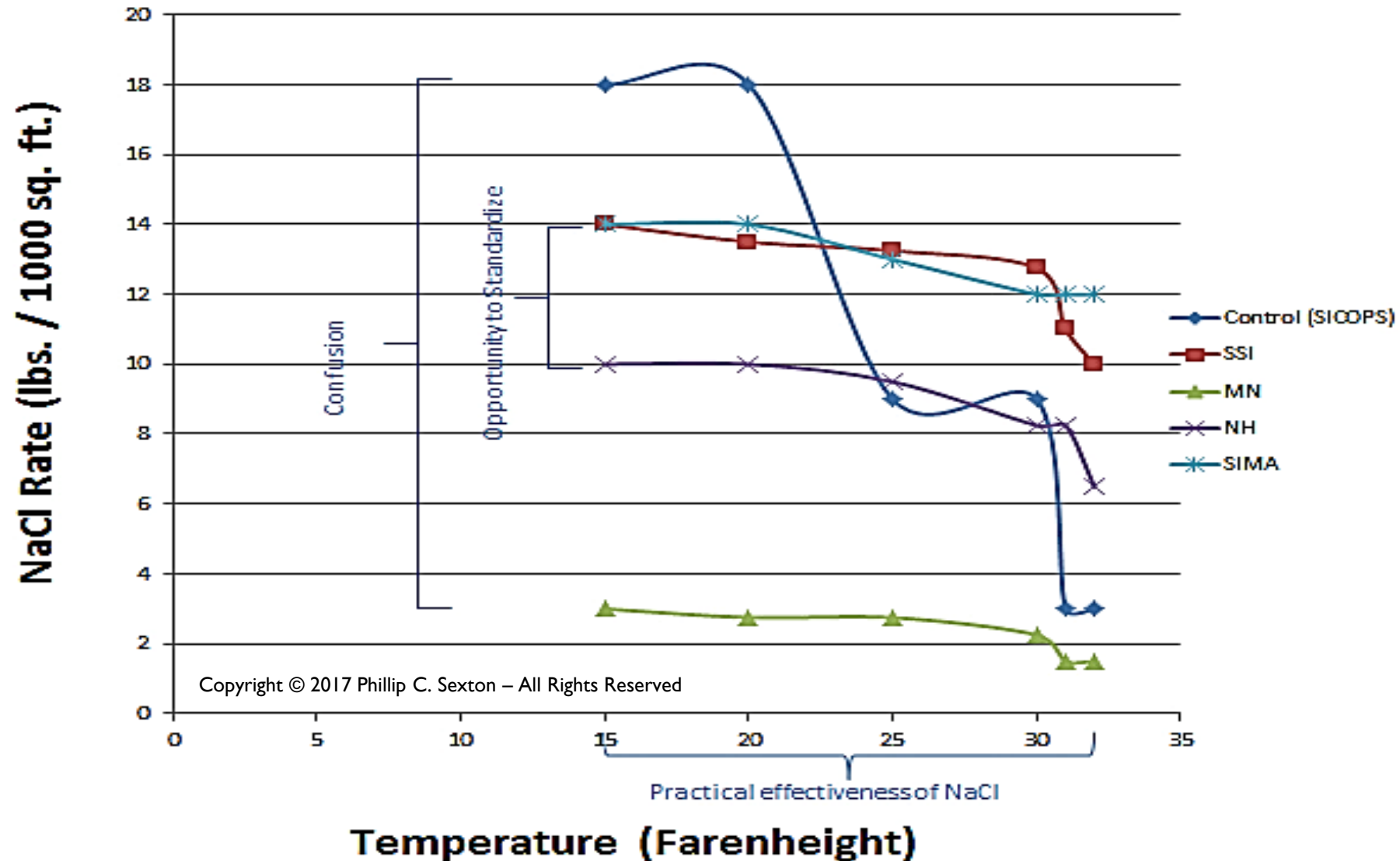
- 2,500 + properties in 2 provinces & 10 states
 - >150,000 + tons of salt measured
 - Over 100,000,000 data points collected
-
- ✓ Preliminary baseline of salt application rates and frequencies
 - ✓ Identify trends in over application from real world application data
 - ✓ Document methods that reduce salt use
 - ✓ Evolution of a formal process of data analysis and refinement to scale



www.witadvisers.com/swim



Salt Application Rate Benchmarks



#1 Driver - LOS

Property owners /managers and patrons generally want to hear and feel “crunch”





Picture Time
Feb 3, 10:19 AM EST

Signal
Bars:1 | Quality: 0

Resolution
640*480

Voltage
14.8826 V

Exposure
1

Spot Picture

[Schedule](#)

Air Temperature
-5.4°C | 22.3°F

Reports

[30 sec](#)

New Winter Event Communication

Contact Info

Site Store #37 Wegmans
Name Christi
Via Phone
Date 2/3/2018
Time 7:19:56 AM

Message Details

She called and asked for plowing and salting. I asked her what the lot looked like and she said covered and they needed more salt.
I explained that we plowed and salted this morning. I told her we would look at the site and evaluate the need for service. I told her we need to let the salt work before plowing it back up.
She didn't seem thrilled but was understanding.

Customer contacted us

Occurrence 1st contact re: this

Regarding

<u>Pavement</u>	<u>Sidewalks</u>
X Plowing	Shoveling
X Salting	Deicing
Lot brining	Walk brining

Action Taken

Going to look at the site

Reporting

Svc. Request	Ice
Drifting	Snow
Ends Buried	Dusting
X Wet	Trace
Dry	Temp
Complaint	Compliment
Damage	



Picture Time
Feb 3, 9:19 AM EST
Signal
Bars:2 | Quality: 0

Resolution
640*480
Voltage
14.5779 V

Exposure
1
Spot Picture
[Schedule](#)

Air Temperature
-7.9°C | 17.7°F
Reports
[View](#)

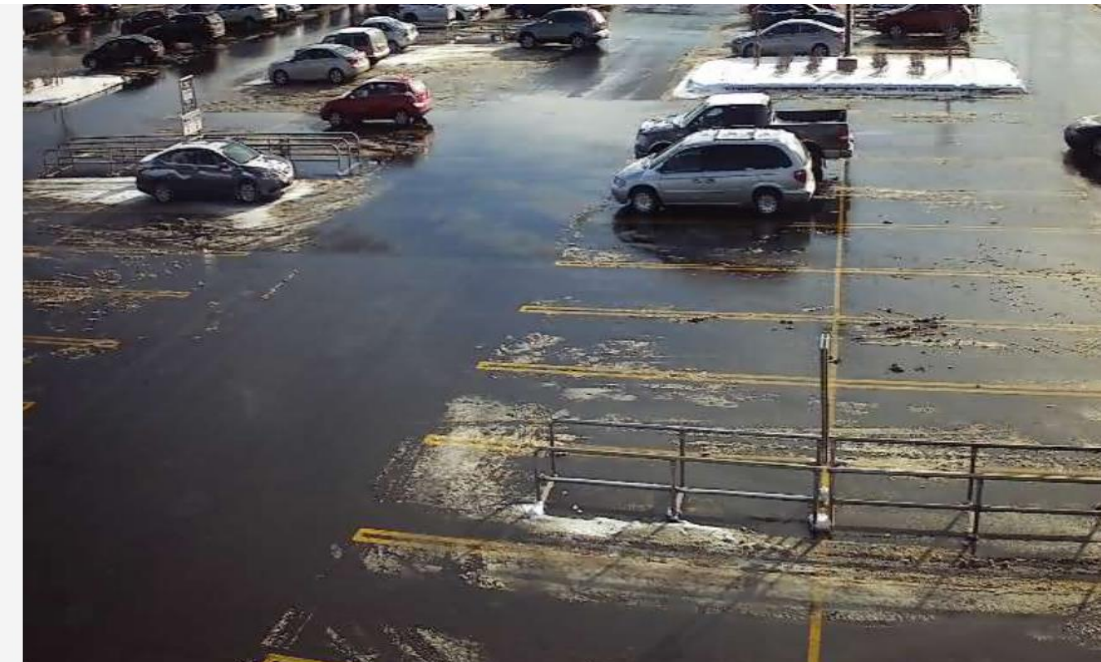


Picture Time
Feb 3, 7:19 AM EST
Signal
Bars:2 | Quality: 0

Resolution
640*480
Voltage
12.5969 V

Exposure
1
Spot Picture
[Schedule](#)

Air Temperature
-10.3°C | 13.6°F
Reports
[View](#)



Picture Time
Feb 3, 10:19 AM EST
Signal
Bars:1 | Quality: 0

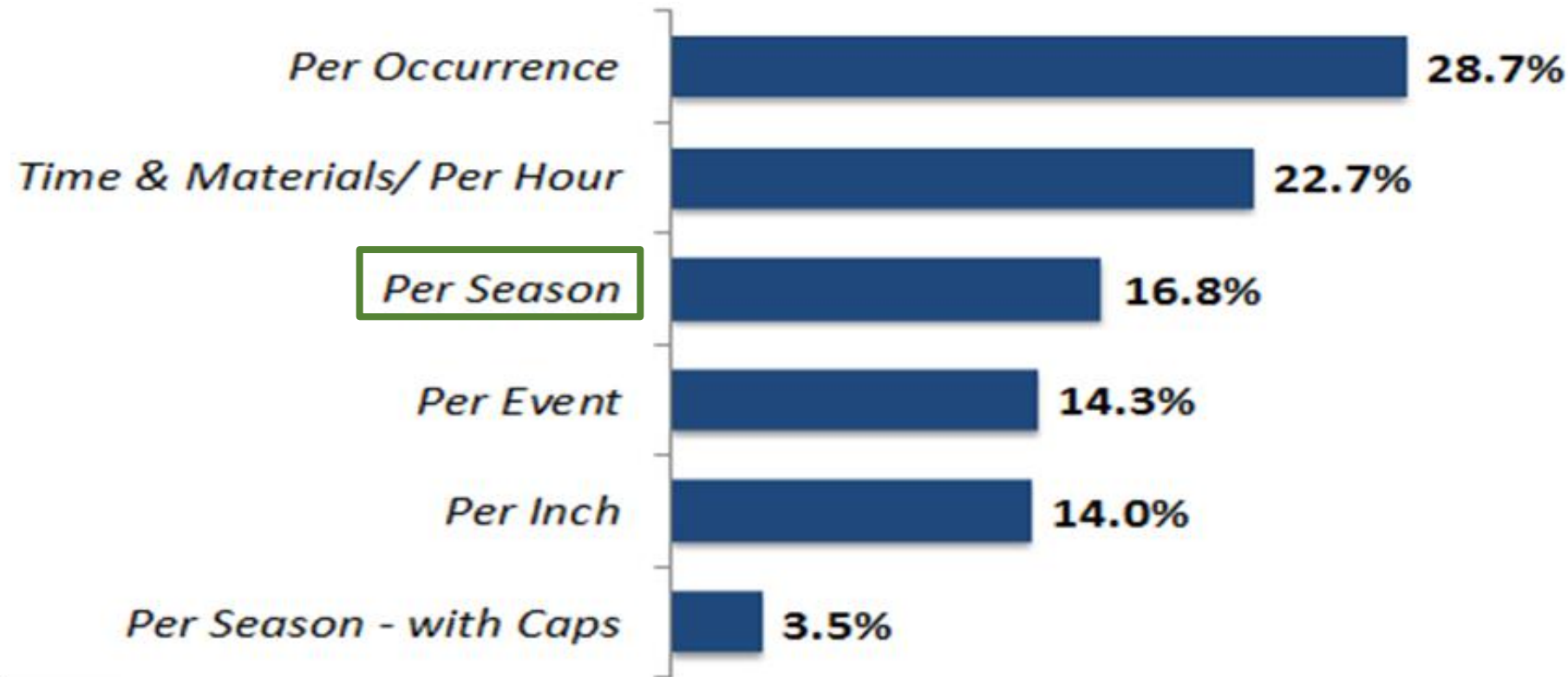
Resolution
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Voltage
14.8826 V

Exposure
1
Spot Picture
[Schedule](#)

Air Temperature
-5.4°C | 22.3°F
Reports
[View](#)

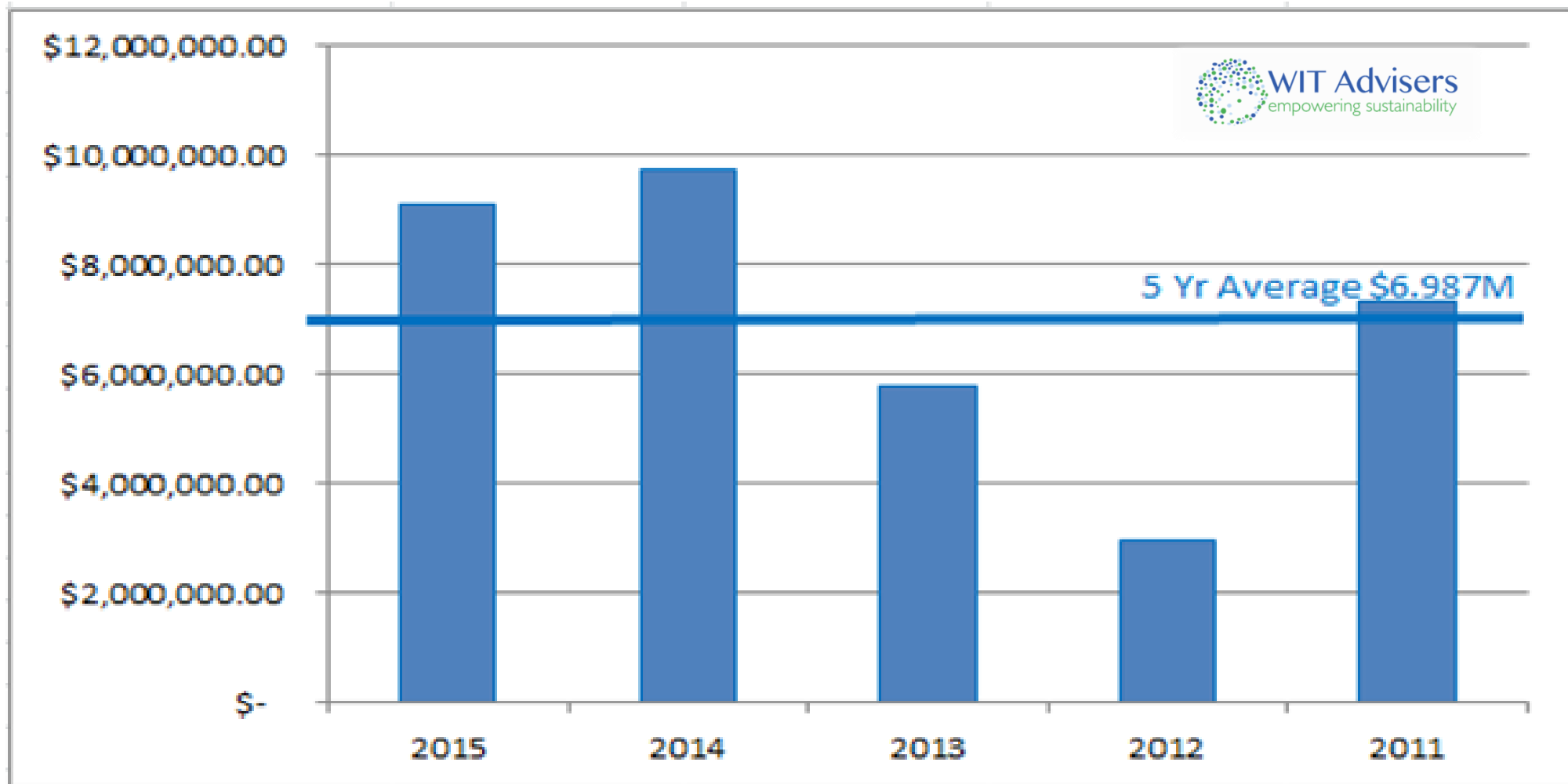
#2 Driver - Economics

Only one way winter management services (& salt) is sold
incentivize for efficiency.



Economics – Why properties want change

5 year spend analysis





Discovery - *Wegmans*

Stores generally still want “crunch” or “wet”...
Until we set a new expectation.





SWiM™ Guidelines enable a better way...





Integration

- SWiM™ contracts
- SWiM™ weather stations
- SWiM™ Salt tracking
- Anti-icing (pre-storm)
- Optimization Technology
- Automated monitoring
- Accountability (Certification)





Co\$т Benefit Analysis

SWiM™ Data Dashboard...

Picture Time

1:49 PM EST

Resolution

640*480

Air Temperature

-1.7°C | 29.0°F

Schedule

15 min 640

Scheduled Time

1:45 PM

Exposure

1

Pavement Temperature

ERROR

Voltage

14.0699 V

Wegmans | Onondaga

SUMMARY

Total Jobs	6	06:28:57	Material	6	19285.0	Total Time on Site from GPS	09:23:10	Total Time on Site from APP	09:23:10
Service	Count	Duration	Material	Count	Quantity	Equipment	Time	Employee	Time
Salt Application	6	06:28:57	Bulk Salt (lbs)	6	19285.0	T-115	03:19:12		
						T-87	00:01:47		
						T-75	01:26:09		
						T64	02:10:54		
						T-105	02:24:08		
						T92	00:01:00		

Fairmount

Action	Entity	Start	End	Service	Material	QTY	Man Hours
Work order Finished	Equipment: T64	07 Feb 2018 at 15:41	07 Feb 2018 at 16:29	Service Salt Application	Bulk Salt (lbs)~3999.0	3999.0	0.8
Employee Times on Job:							

Savings (conservatively) = \$1.7 million & 20,000,000 lbs. of salt per year

.6tons x \$172/ton x 8 acres = \$627 x 30apps = \$24,768/year x 67 stores

Employee Times on Job:

Action	Entity	Start	End	Service	Material	QTY	Man Hours
Work order Finished	Equipment: T-105	07 Feb 2018 at 14:57	07 Feb 2018 at 16:21	Service Salt Application	Bulk Salt (lbs)~8603.0	8603.0	1.39
Employee Times on Job:							

Wegmans James

Action	Entity	Start	End	Service	Material	QTY	Man Hours
Work order Finished	Equipment: T-115	07 Feb 2018 at 08:11	07 Feb 2018 at 08:40	Service Salt Application	Bulk Salt (lbs)~619.0	619.0	0.47
Employee Times on Job:							

Action	Entity	Start	End	Service	Material	QTY	Man Hours
Work order Finished	Equipment: T-115	07 Feb 2018 at 11:31	07 Feb 2018 at 12:29	Service Salt Application	Bulk Salt (lbs)~1144.0	1144.0	0.96
Employee Times on Job:							

Wegmans | James Street

Picture Time

1:49 PM EST

Scheduled Time

1:45 PM

WIT Advisers

empowering sustainability



Co\$т Benefit Analysis

SWiM™ Data Dashboard...

**Savings (conservatively) = \$1.7 million & 20,000,000 lbs.
of salt per year**

.6tons x \$172/ton x 8 acres = \$627 x 30apps = \$24,768/year x **67 stores**



Ability to add
10 - 12 More
Stores



Co\$т Benefit Analysis

SWiM™ Data Dashboard...

Savings (conservatively) = \$1.7 million & 20,000,000 lbs.
of salt per year

.6tons x \$172/ton x 8 acres = \$627 x 30apps = \$24,768/year x **67 stores**



**4,000 + fewer
loads / trips**



SWiM™ Success - *Wegmans*

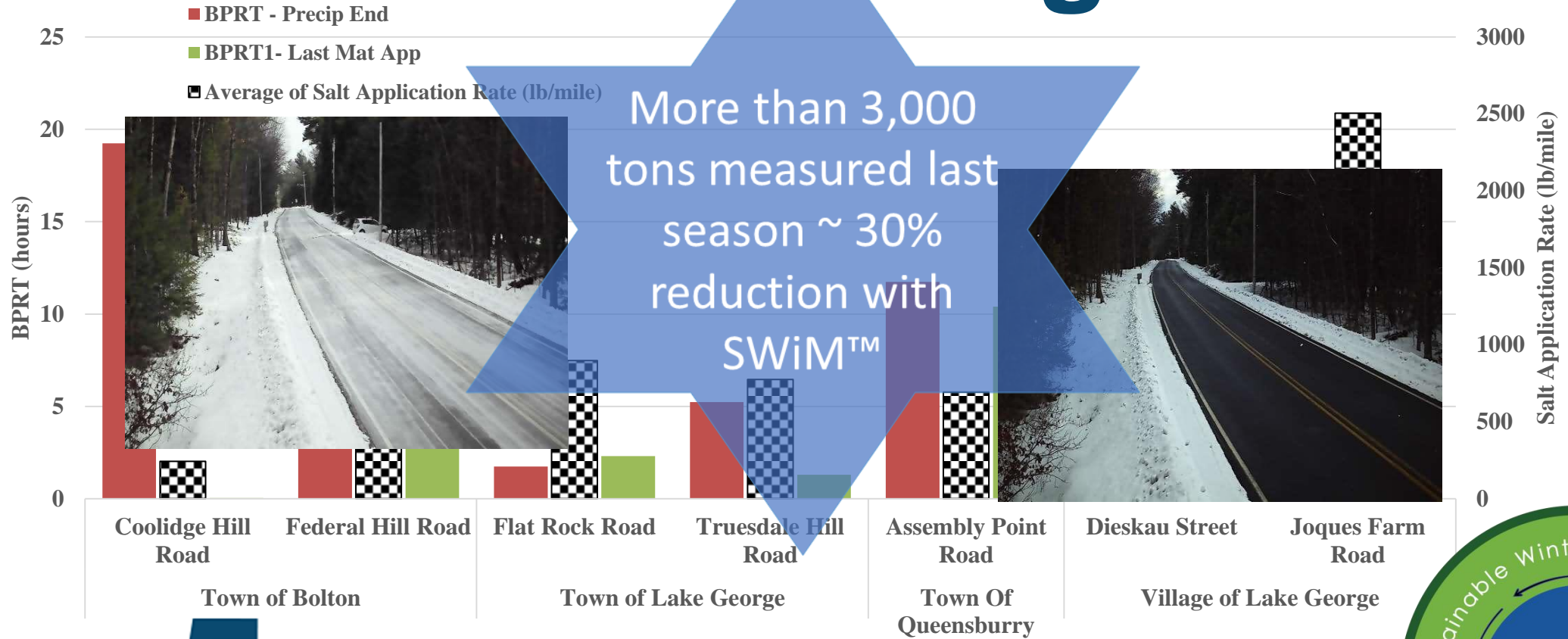


Success Statement:

Wegmans is known as the retail industry leader for sustainable winter management best practices, including:

- **Predictable and repeatable costs** that empower efficiency, accountability and the ability to identify future cost savings and salt use reductions.
- **Reduced impact to the natural environment** (water), decreased damage to infrastructure and being ahead of near future de-icing salt use regulations.
- **Enhanced reputation** as the first retail grocer to earn SWiM™ SITE™ Certification

Bare Pavement Regain Time





WIT Advisers
empowering sustainability

WITAdvisers.com

psexton@witadvisers.com



Sustainable Winter Management (SWiM™) Program and Certification Process

Phase I. Discovery

Stakeholder Engagement:
Engage operations team(s) including; supervisors contractors & site managers

GAP:
Identify and assess improvement opportunities utilizing SWOT and PESTLE processes

LOS:
Develop level of service (LOS) specifications to pilot . ID candidate sites / routes / regions

Phase II. Integration

BMPs:
Fusion of SWiM™ guidelines, industry best management practices (BMPs) and property specific expectations

Data Acquisition:
Site maps, size of sites / routes, level of service (LOS) expectations

Site Engineering:
Optimized site inventory and storm response planning; Develop cataloged site maps

Phase III. Analysis

\$\$\$:
Review current budgeting, cost estimates and actual spend history

Expectations:
Confirm Level of Service (LOS) and build optimal specifications service providers can be consistently measured by

Weather:
'Normalized' weather data history utilized to develop accurate production and cost estimates

Phase IV. Optimization

Policy:
SWiM™ guidelines are adopted as standards of policy

Capacity:
Develop a catalog of required resource allocations for each site / municipality

Budget:
Develop a catalog of cost estimates to budget for each site / municipality

Innovation:
Implement SWiM™ approved tools and technology

Phase V. Certification

Training:
Conduct SWiM™ program training for all internal stakeholders

Automation:
Implementation of SWiM™ automated field data acquisition technology

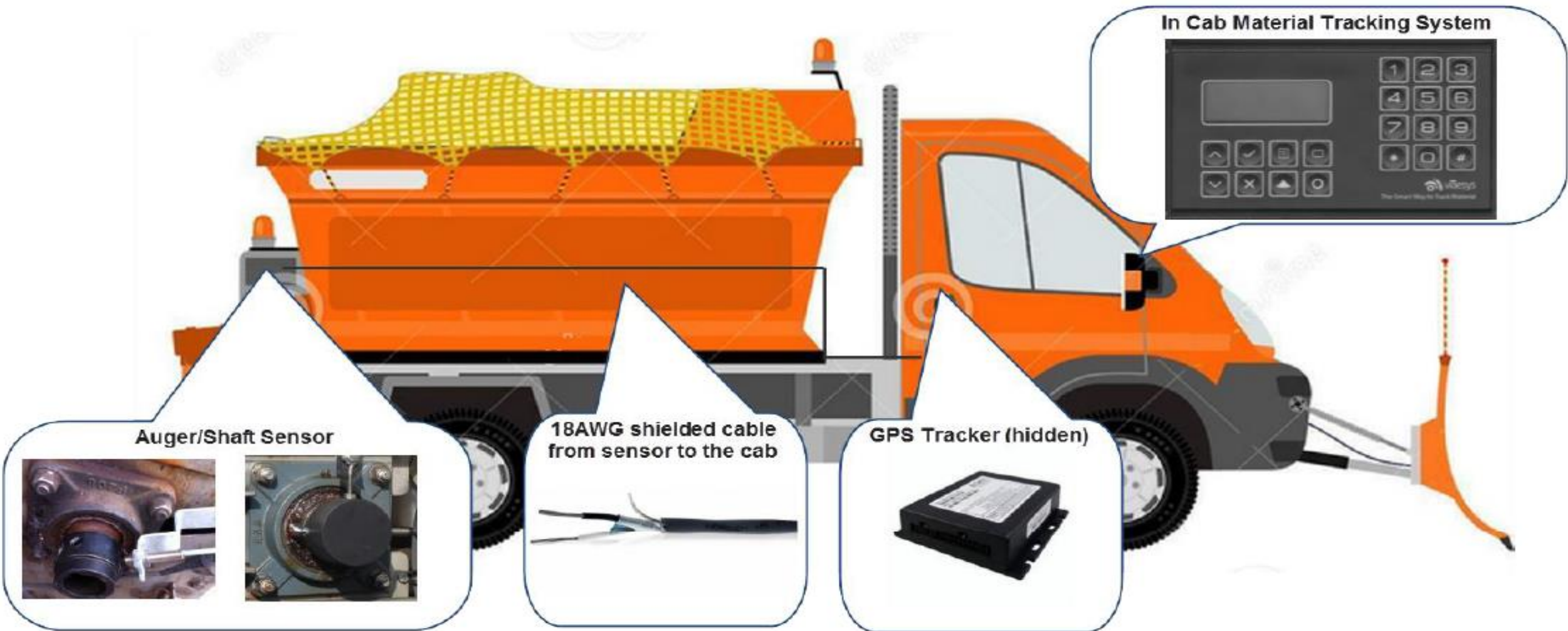
Accountability:
'Real Time' performance dashboard and historical reporting

SWiM™ Certifications:
SITE | ROAD | SR50™ CF23™
Annual audit and measuring processes for continuous improvement (CI)





Measure



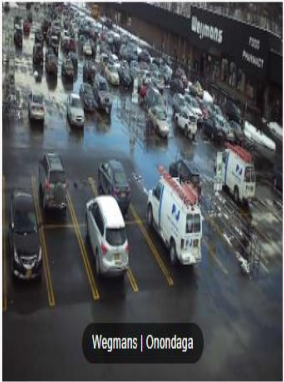
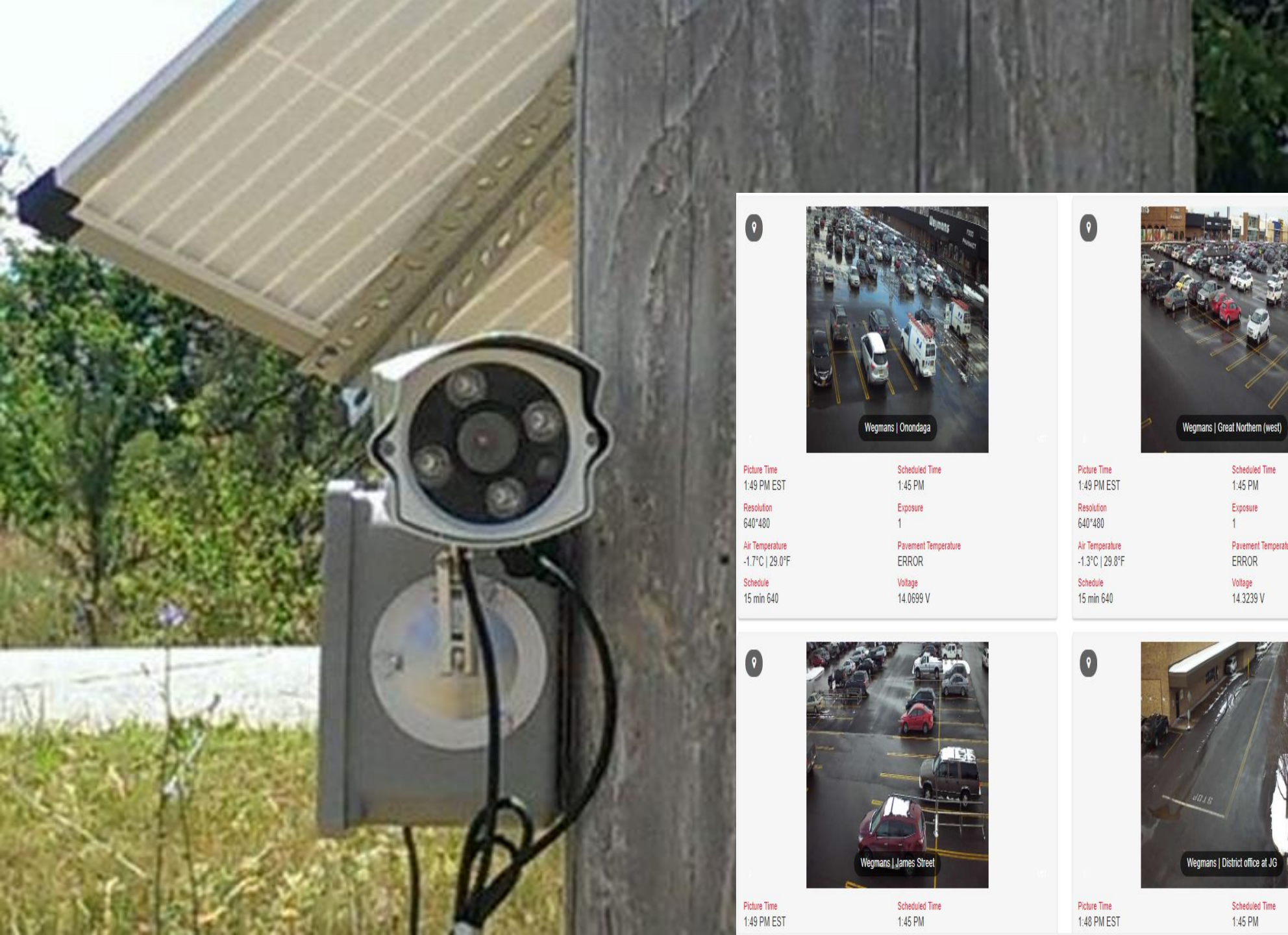
Calibrate



Prevent

Anti-Icing: A strategy of applying salt directly to a paved surface before a snow storm begins and before snow and or ice has bonded to the pavement.

- A **Proactive** approach to winter management
- **Prevents** the bonding of snow and ice between the road surface and the snow/ice layer
- **Optimizes** the melting process



Wegmans | Onondaga

Picture Time
1:49 PM EST

Resolution
640*480

Air Temperature
-1.7°C | 29.0°F

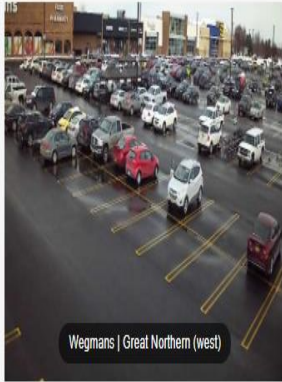
Schedule
15 min 640

Scheduled Time
1:45 PM

Exposure
1

Pavement Temperature
ERROR

Voltage
14.0699 V



Wegmans | Great Northern (west)

Picture Time
1:49 PM EST

Resolution
640*480

Air Temperature
-1.3°C | 29.8°F

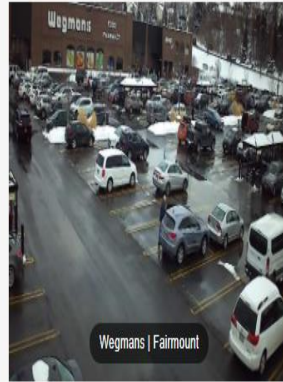
Schedule
15 min 640

Scheduled Time
1:45 PM

Exposure
1

Pavement Temperature
ERROR

Voltage
14.3239 V



Wegmans | Fairmount

Picture Time
1:49 PM EST

Resolution
640*480

Air Temperature
-2.4°C | 27.6°F

Schedule
15 min 640

Scheduled Time
1:45 PM

Exposure
1

Pavement Temperature
ERROR

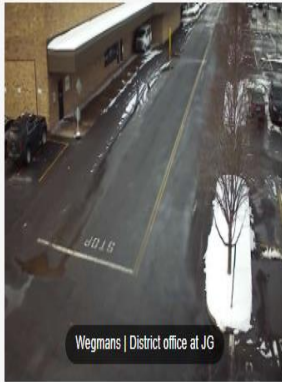
Voltage
14.3239 V



Wegmans | James Street

Picture Time
1:49 PM EST

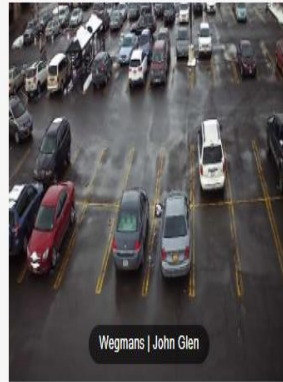
Scheduled Time
1:45 PM



Wegmans | District office at JG

Picture Time
1:48 PM EST

Scheduled Time
1:45 PM



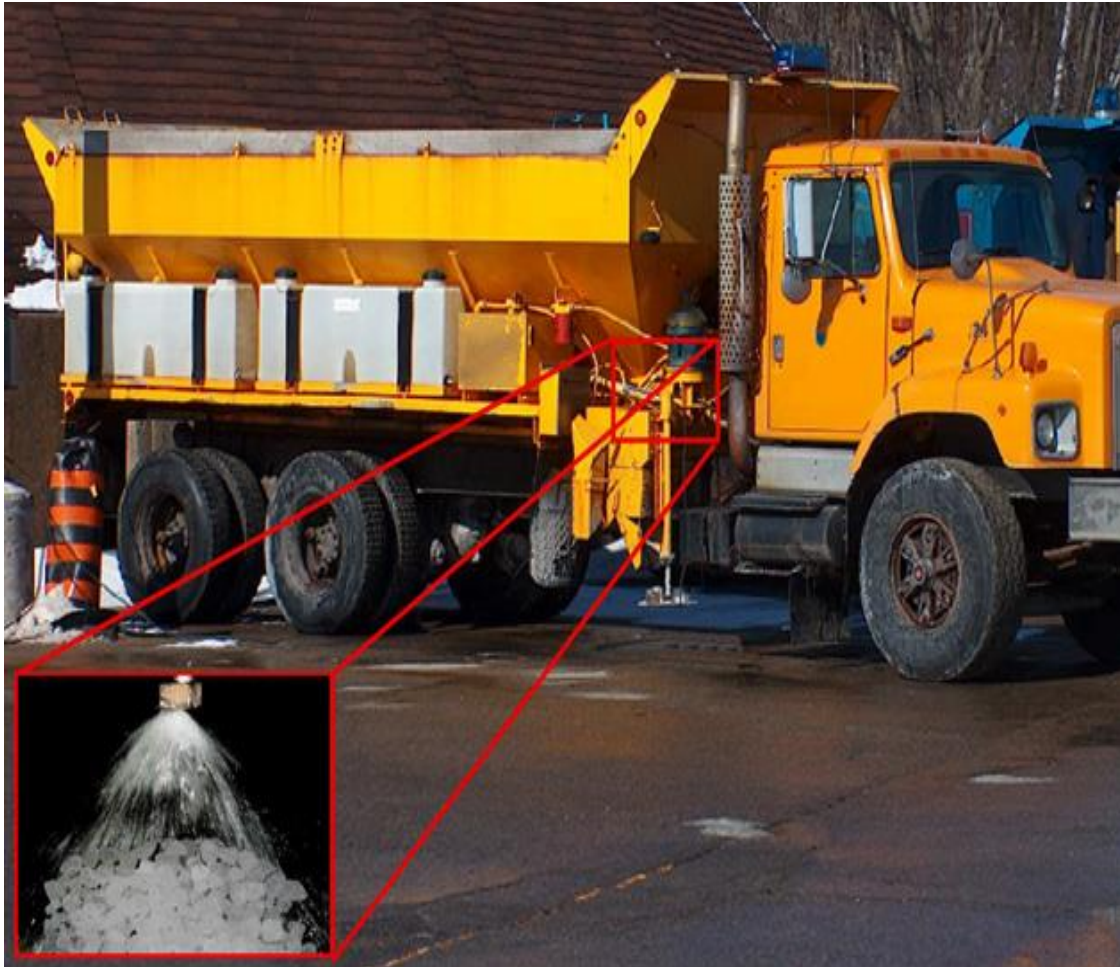
Wegmans | John Glen

Picture Time
1:48 PM EST

Scheduled Time
1:45 PM

Optimize

DLA, Pre-Wetting and Segmented Plows





Optimization

- Sidewalk Brine (chloride and chloride free)
- Pre-Wetting
- Segmented Plows

Brine Testing @ Wegmans James

